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ABSTRACT

The proposition, "That measurement issues in competency-based educational programs (CBE) are not different from those in other kinds of testing (NCBE)" must be declared false. (1) Measurement in CBE focuses on the present while NCBE measurement focuses on information needed for future planning. (2) CBE measurement starts with definitive statements of behavior repertoires at various levels of strata and substrata of specificity. NCBE measurement starts with the need to identify aspects of current behavior predictive of the impact of educational experiences. (3) What the student is asked to do on a test in CBE is defined by behavioral objectives. In NCBE surrogate measures, highly correlated with behaviors taught for can be used to gain efficiency in measurement. (4) Adequacy of sampling of a specified behavior domain is the critical criterion for a test used in CBE. The value of a test in identifying differential impact of educational environments is a critical criterion for NCBE measures. (5) CBE measurements are used to make a two-way classification with accuracy--competent or not competent as defined by a stated standard regarding a specified behavioral repertoire. NCBE measurement normally calls for reliable identification of multiple levels of individual differences that are related to decisions that must be made. (RC)

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NCME Debate
Resolved: That Measurement Issues in Competency-Based Educational Programs Are Not Different From Those in Other Kinds of Testing*

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The proposition before us is, "Resolved: That measurement issues in competency-based educational programs are NOT different from those in other kinds of testing." I will speak against this proposition. The arguments against it grow out of the critical role measurement is expected to play in competency-based education, a role not expected of measurement in non-competency-based education. Whether the competency-based education movement is good or bad for education generally is an issue that also needs debate. But, its advocates are drawing much attention to it currently, the issues related to it need careful examination, and the measurement aspects of the approach are, indeed, so basic to its success they should not be ignored.

The way in which measurement serves competency-based education is different than that of non-competency-based education and this leads to the measurement issues being different. That this statement is true -- and the proposition before us false -- can be made clear if one considers what measurement is expected to contribute to competency-based education and the steps necessary to carry out the measurement phase. With this delineated, comparison with the use of measurement in more conventional educational approaches can be made.

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Competency-based education calls for the identification of a domain of behavior to be taught for and its "mastery" measured. The measurement aspect is focused on the present. Its purpose is to show whether at the time of testing a person is competent or incompetent in regard to that behavior domain. The approach calls for definition of the total behavior repertoire taught for with sufficient delineation to permit the drawing of a defendable sample of the defined behaviors which will allow legitimate generalization about a student's ability to perform on the total set of behaviors in that repertoire. Each element of the process is critical to accomplishment of the role measurement plays in competency-based education and in turn measurement is critical to competency-based education. The measurement process involved a definitive set of statements that set forth the totality of the behavior domain. There are a number of ways to get these. One is through branching. A general overall statement of the competency can be spelled out in terms of a small number of behaviorally stated general objectives, each to be subdivided into a larger number of less general behavioral objectives, each of which is further subdivided into a still larger number of more specific objectives -- the process continuing until a level of specificity is reached where one can start preparing items. The number of steps, the ultimate number of sub-behavioral objectives and the number of items needed will, of course, differ from area to area. For example, competency in writing, or reading, the lack of which is getting so much press these days (rightly or wrongly) poses a much bigger task in this process than does, say, competency in multiplying whole numbers. In multiplying whole numbers, Hively and his colleagues identified just 25 sub-domains needing to be adequately sampled. Obviously, competency-based

education requires the careful definition of many times this number of sub-domains (specific behaviorally stated objectives if you prefer) to adequately define competency in writing or reading -- or even to define computation with whole numbers for that matter (i.e., addition, subtraction and division as well as multiplication) for the purpose of designing the measurement instruments required.

Now let's turn to the process of developing the measuring instrument that will identify competency of the behavior domain. Basically it involves reversing the process just described. For each specific objective (or sub-domain) technically adequate items, i.e., each a valid and reliable measure of the behavior set forth in the specific objective, are needed. The items prepared for each specific objective must be such that content coverage and the number of items appropriately sample the behavior sub-domain identified by the specific objective. Now, the process moves back up from the specific to the more general competency the measurement is designed to demonstrate. The more specific objectives must each be appropriately (in a statistical sense) represented in the combined set of items used to demonstrate competency of the behavior repertoire defined by sub-objectives at higher levels of strata of generality. The overall set of items must be defendable as a sample of the total behavior repertoire regarding which competency or non-competency is to be declared.

True, the amount of time and effort that must be devoted to testing is great if one is to effect a true competency-based education program. However, if competency (or lack of competency) of the behavior repertoire is to be determined, each such repertoire must be sampled with technically adequate items to statistically allow generalization to the total behavior repertoire.

So much for the role of measurement in competency-based education. Next, one must address the proposition. Are the issues involved different than those of non-competency-based education? A few basic comparisons will show the answer to this question to be yes.

First, and most basic, is the purpose to be served by the measurements made. Competency-based education focuses on the present. The role of measurement is to accurately identify competency or lack of competency of a student at the time he is tested on the total behavior repertoire taught for. Non-competency-based education focuses on the future. The emphasis is not on performance in the classroom on a test given at the end of a unit or a course as is the case with competency-based education. Rather, emphasis is on what performance on the test in the classroom tells us about the student's ability to perform when he leaves the classroom. It is not testing for testing's sake. In Cureton's terms, what the student does on the test in the classroom is an intermediate criterion measure. The ultimate criterion is utilization of what has been learned when the student leaves the classroom.

Like competency-based education, the items on the test call for the behaviors taught for. Rather than being designed to accurately identify competency of a predefined behavior repertoire at the time of testing in the classroom, however, the goal is to identify who will be able to handle certain situations -- the next unit, the next grade level work or entry level job demands. Depending on the situation this may entail survey or more detailed diagnostic testing. There is no need to systematically sample every sub-domain taught for. If the student can do long division, there is

no need to systematically sample his ability to do subtraction. If the student can do an appropriate analysis of a problem situation and design an adequate solution, there is no need to systematically sample his total knowledge base in that area. If ninety-nine of 100 students who score above the 90th percentile do well when they move on to the next unit of study, whether or not a total behavior repertoire has been defendably sampled by the test is of little consequence in deciding whether those who score at that level are ready for the next unit.

The purpose then sets the measurement issues and dictates the measurement procedures. For example, consider attempts to lessen the amount of time and effort devoted to testing. To meet the purpose of competency-based education, decreasing the number of items used to sample a behavior repertoire would be permissable. It will increase the probable error of generalization to the total repertoire. Dropping the appropriate proportional number of items for a sub-objective would not provide the information needed.

Surrogate measures to gain efficiency permissable in non-competency-based education are not acceptable in competency-based education. Take an example. In conventional achievement measurement, we know that the results obtained by asking students to recognize correct spelling is highly correlated with results from asking them to produce correct spelling. Thus, we use machine scorable spelling tests that allow us to increase the size of our sample of spelling, score it much quicker, with greater reliability and much less effort. But, it gives us good information on what the results would be in the more cumbersome open-end mode. In competency-based education, one must ask for demonstration of the competency behavior defined by the objective.

In one sense, measurement in competency-based education is more simple. It calls only for measurement to achieve a two-way classification; demonstration that the people tested have or have not achieved competency of the behavior repertoire taught for. Conventional approaches call for the identification of individual differences related to the likely impact of any of a number of alternative future experiences that might be structured.

In summary, I have pointed to the facts that: (1) measurement in competency-based education focuses on the present while measurement in non-competency-based education focuses on information needed for planning the future; (2) competency-based education measurement starts with definitive statements of behavior repertoires at various levels of strata and sub-strata of specificity. Non-competency-based education measurement starts with the need to identify aspects of current behavior predictive of the impact of educational experiences that can be provided or other experiences the student will have to face; (3) what the student is asked to do on a test in competency-based education is defined by the behaviorally stated objectives. In non-competency-based education surrogate measures, highly correlated with behaviors taught for can be used to gain efficiency in measurement; (4) adequacy of sampling of a specified behavior domain is the critical criterion for a test used in competency-based education. The value of a test in identifying differential impact of educational environments (e.g., further exposure to the topics just studied, the next grade level work, unit or type of instruction) is a critical criterion for measures used in non-competency-based education; (5) competency-based education measurements are used to make a two-way classification with

accuracy -- competent or not competent as defined by a stated standard regarding a specified behavioral repertoire. Non-competency-based measurement normally calls for reliable identification of multiple levels of individual differences that are related to decisions that must be made.

With these differences identified, it is obvious that the proposition before us, "That measurement issues in competency-based educational programs are NOT different from those in other kinds of testing" must be declared false.